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- du Pond, 1911.

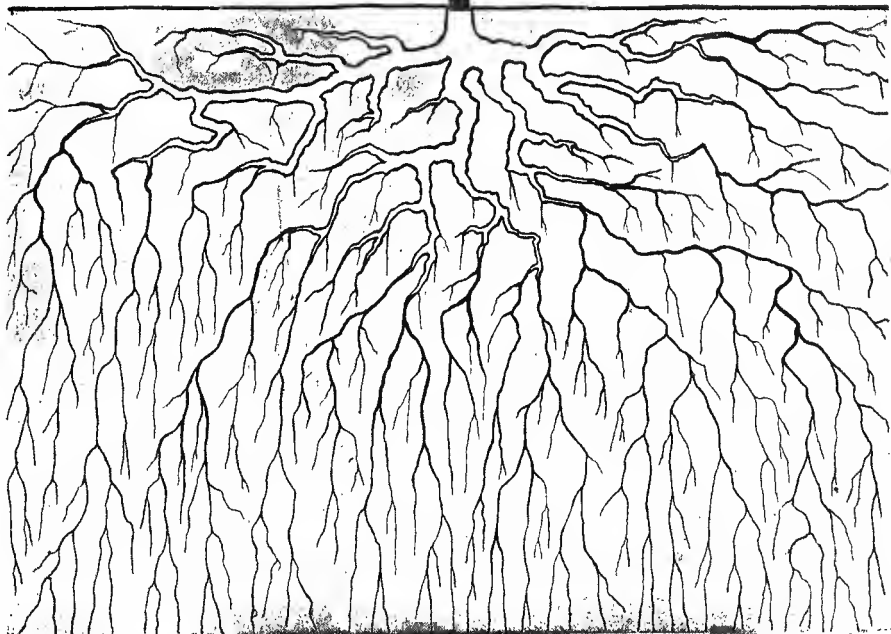
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Tree planting with du Pont dynamite; new



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Tree Planting



E. I. DU PONT DE NEMOURS POWDER COMPANY

WILMINGTON, DELAWARE, U.S.A.

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Tree Planting

WITH



DYNAMITE

NEW AND VALUABLE
INFORMATION FOR
PEACH, APPLE, PEAR,
CHERRY, ORANGE,
LEMON, PECAN OR-
CHARDISTS, NURS-
ERYMEN, GROWERS
OF SMALL FRUITS, ETC

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ESTABLISHED 1802

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WILMINGTON, DEL.



Figure

Five year old apple tree planted where old apple tree died of fungus growth and was blasted out. See Craig method page 11. Man is holding 8 foot pole.

DYNAMITE IN THE ORCHARD



THAS been conclusively proven that dynamite is an exceedingly valuable aid in the successful growing of trees. Those who have tried it are thoroughly convinced that no method of excavating the hole in which to plant a young tree is so economical, quick, or productive of desirable after-results as blasting with dynamite.

Sometime ago it was the prevailing idea that dynamite was unnecessary for tree planting unless the soil chanced to be underlaid with hardpan, in which case the explosive was regarded as valuable for breaking through the hard soil. It has been found by experiment, however, that trees thrive better when planted in blasted holes than in hand dug holes, even when no hardpan is encountered.

The explanation of this is simple. It is because the explosion of the dynamite loosens up the soil for yards around the spot, kills all grubs, worms or other animal life likely to injure the young tree and thus makes root growth easy; whereas, digging the hole with tools tends to pack the earth around the roots and retard their growth.

Scientific agriculturists have discovered that water is the most important element in all kinds of plant growth. Soil which is of the natural consistency to allow water to circulate freely through it and still retain or conserve it so that it is available at all times for growing plants, may be considered as ideal for agricultural purposes. Few soils possess this natural consistency. Other soils, which may be classified as good, average, or fair, must have artificial preparation in order to make them produce the results that may be expected from the rarely-found perfect natural soil.

Few persons understand the principle of plant growth. It is not necessary, as many suppose, that the root of a plant shall come in actual contact with all of the plant food elements of the soil needed for the sustenance of the plant or tree. Plant roots have the power to draw from the surrounding soil the necessary elements of plant food, provided the soil is of such a character as to permit the passage of these elements through it. Water or moisture is the carrier of these plant food elements through the soil and into the plant roots. This will indicate the importance of a porous soil which will permit the free passage of water through it in order that plants growing upon the surface may be properly nurtured for rapid and healthy growth, and it is because the action of an explosive on soil causes it to become thoroughly loosened and aerated that trees planted in blasted holes show so much stronger and healthier growth than trees planted under old conditions.

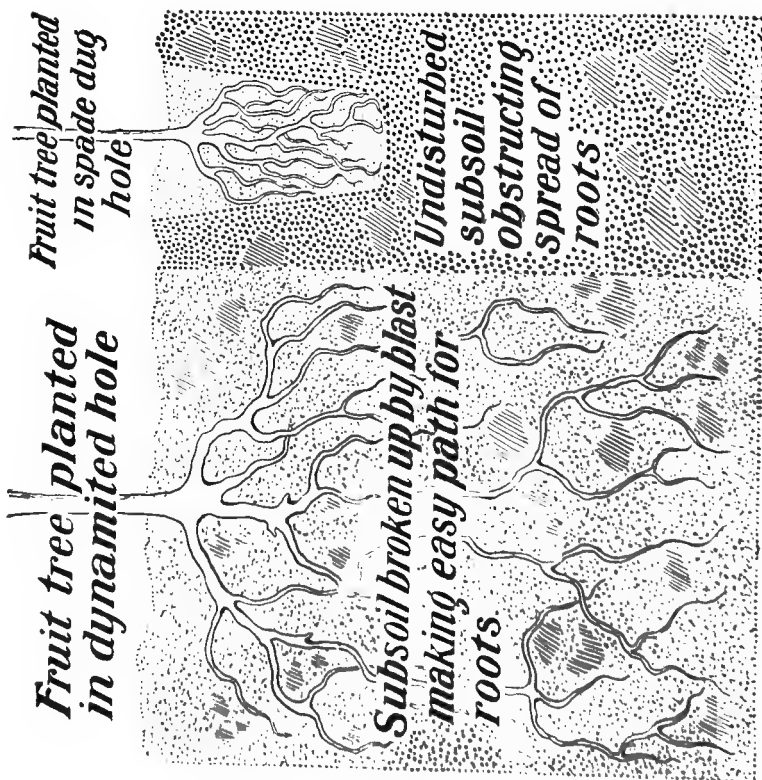


Figure 2
Diagram of Soil Section

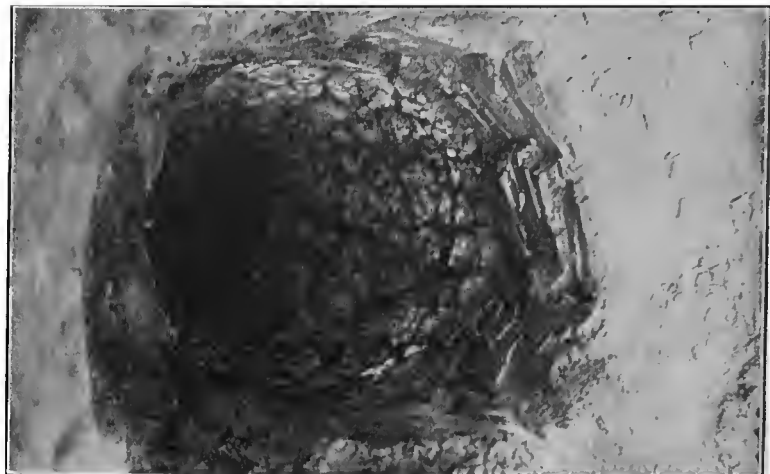


Figure 2
Top of Hole Blasted for Planting Fruit Tree
(Note radial fissures.)

In order to give those who may not understand the subject an idea of the scientific principles of plant growth, we will quote Mr. W. J. Spillman, Agriculturist in charge of Farm Management Investigations, Bureau of Plant Industries, U. S. Department of Agriculture. He says in a recent bulletin:

"Plant food is dissolved in water. While a plant is growing, a constant stream of water flows up through it and evaporates at its leaves. For every pound of increase in dry matter made by the plant, from 300 to 500 pounds of water flow up through it.

"Plants in their growth make use of thirteen elements, nine of which they secure directly from the soil. These are called the mineral plant foods. They are phosphorous, potassium, calcium, magnesium, sodium, iron, silica, chlorine and sulphur. Soil consists mainly of small particles of rock. Nearly all kinds contain more or less of these mineral plant foods. Every year the soil water dissolves off a thin surface layer from each particle and plants appropriate this water, thus securing their mineral plant food. Hydrogen, another important element of plant food, is also secured from water.

"In order to produce a ton of hay on an acre of land, it is necessary that the growing grass pump up from that ground approximately 500 tons of water. In order to supply this enormous quantity of water, the soil must not only be in a condition to absorb and hold water well, but must be porous enough to permit water to flow freely through it.

"In addition to acting as a water carrier for plant life, soil must permit a proper circulation of air through it. Nearly half of the volume of ordinary soils is occupied by air spaces. Soil which becomes so compact as to stop the air passages, is too wet for most crops and needs drainage, for plant roots must be supplied with air and the soil must be porous enough to permit of its free circulation. One of the most important objects of plowing is to loosen up the soil and mix fresh air with it."

Orchardists and nurserymen who have had long experience in planting trees in holes prepared by dynamite blasts, have learned that compact subsoil is broken up by the blasts, which enable the land, thus made porous, to absorb plenty of water in rainy weather and store it up for the use of growing plants in dry weather. As Mr. Spillman says, this water in ascending to the plant roots, carries with it the many necessary soluble fertilizing elements.

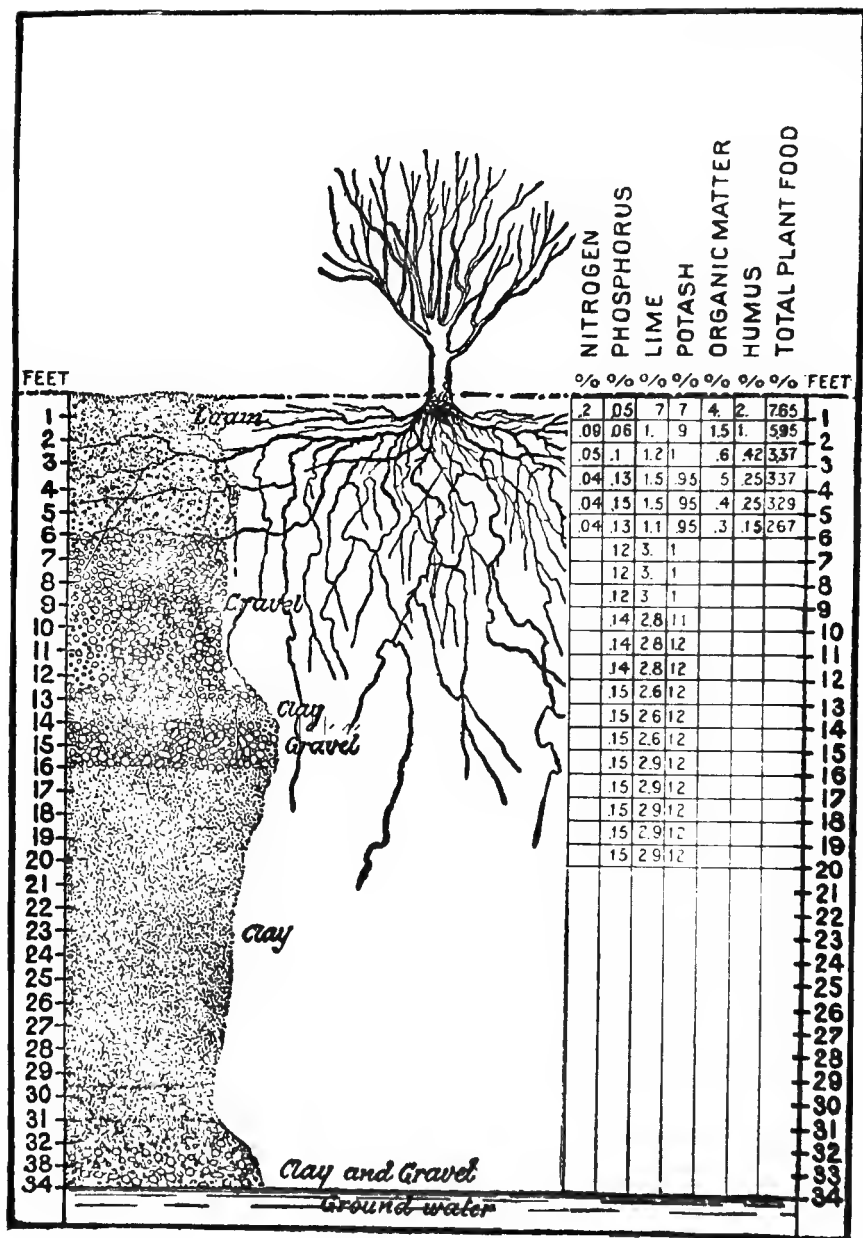


Figure 4

Soil section showing downward growth of roots to 21 feet, and percentages of various plant foods at different depths. As the drawing and tables were obtained from different sources, the percentages do not indicate those in the soil in the drawing, but are composite percentages from analyses of different soils.

Few persons realize the depth of tree root expansion. In one of the "Farmers' Bulletins" issued by the United States Department of Agriculture, is shown a view of a cross section of orchard land which we reproduce on the opposite page. Note the scale on the sides, indicating that this tree has sent its roots downward 21 feet into the soil. This is natural growth. Under normal conditions a healthy tree will seek its food in this way; but suppose a layer of hardpan is encountered at a depth of five or six feet? The roots must then spread out laterally for twenty feet or more. The result of this unnatural sidewise growth is that each tree in the orchard is compelled to go over into the feeding supply of its neighbor and consequently does not receive the necessary amount of plant food to properly nurture it and allow of its rapid growth. Its yield of fruit is also lessened by this forced encroaching of one tree on the feeding ground of its neighbor. Then too, a brief dry spell exhausts all the moisture from the thin feeding ground of such a tree stopping its growth or killing it.

Dynamite blasting proves a simple and effective remedy for this condition. The blast breaks up the hardpan and permits the roots to take their natural downward course into the lower strata of soil in which plenty of plant food elements are available. Under these conditions, one tree is not interfered with by another; each one receives the benefit of all of the soil allotted to it at the time the surface was measured and laid out at planting time.

It must not be assumed from the above that dynamite blasting is beneficial only when the top soil is underlaid with hardpan. It is of the utmost importance to assist a tree, especially a young one, to send its roots out into its feeding bed as easily and rapidly as possible. The more porous and loose the soil, the more rapid will be the growth. Even in the loamy soils of Oregon, generally admitted to be the most perfect for fruit tree culture found in the United States, blasting has proven extremely beneficial in forwarding the growth of young fruit trees as is shown in the letter of Orchardist Peasley, which appears on page 9 of this booklet.

The main object to be sought in tree planting, is to so prepare the ground that the growing tree can absorb as large a percentage of moisture as possible from the soil which it occupies. Loosening and aerating the soil accomplishes this purpose. A Cornell University authority advises that a tree planted in soil properly prepared, can absorb 60% of the moisture contained in it.



Figure 5.
Two-Year Old Apple Tree Set in Spaded Hole



Figure 6.
Two-Year Old Apple Tree Set in Dynamited Hole



View of part of Edgerogue Orchard, Grants Pass, Oregon, every tree set with dynamite.

This Interesting Letter from an Oregon Orchardist, Proves the Efficiency and Economy of Dynamite for Tree Planting and Cultivating.

Du Pont Powder Co.,
Wilmington, Delaware.

Grants Pass, Oregon, May 12, 1911.

Gentlemen:—In reply to your inquiry as to our success with orchard trees set in dynamited holes, I am sending you photographs of four trees that answer your question.

Figures 5 and 6 are Bellflower apple trees; Figure 5 was set in a spade dug hole, and Figure 6 in a dynamited hole.

Figures 7 and 8 are Bing cherry trees; Figure 7 was set in a spade dug hole, and Figure 8 in a dynamited hole.

These four trees were part of a shipment of year old nursery stock received and set out the latter part of March, 1909. The photographs were taken about the 15th of April, 1911, two years after setting out, just as they were coming into leaf.

Bellflower apple tree Figure 6 was pinched back in June, 1909, about ten weeks after planting. It was shortened in by removing some two feet of growth from each main lateral the following November. In 1910 it had the same treatment. It is a very vigorous tree with healthy foliage and fine color.

Bellflower apple tree Figure 5 had as good ground to grow in, but was spade set and made such small growth it needed neither pinching back nor pruning. Not a bit of growth, not a leaf has been removed from the head of this tree since planting. The trunk is less than a half inch in diameter, while the dynamite set mate to it, tree No. 1, has several branches thicker and finer than the trunk of Figure 5.

The Bing cherry trees, Figures 7 and 8 have the same identical history as Bellflower apples Figures 4 and 5, with the exception that we did not shorten in at fall pruning Figure 8 as much as we did apple No. 6.

We have heavier tops and taller trees of these varieties in the orchard, but these trees are two favorites, very typical of their kind and strike a favorable average for the lot of five hundred. From 250 apple trees so set we got a perfect stand, not one of which is missing or replaced.

We use dynamite for making holes in planting trees on our very best and deepest ground, as well as the poor spots. It is much cheaper than hand labor; it is much quicker when speed is a most important point and delay will cause the loss of many trees. It insures every advantage to the tree getting a good start.



Figure 7.

Bing Cherry Tree, Two Years Old. Set in Spaded Hole.



Figure 8.

Bing Cherry Tree, Two Years Old, Set in Dynamited Hole

After the orchard is staked, one man with a shovel removes a circle of surface soil from about the stake, usually five cuts or so, which is laid to one side to use in filling the hole to proper level before setting the tree with the roots carefully pruned back.

A second man follows the first with a crow bar and works the hole down where the stake comes out. If a stone or anything of the sort is encountered we dig it out. If a spot of hard sediment or hardpan is encountered the hole is put through. These holes are about eighteen inches deep. We use one stick of dynamite properly fitted with 18 inches of best fuse for the average hole. It is dropped to the bottom of the hole, tamped down, then fuse is lighted. There is very little stuff thrown up, the force going down and out. The holes are allowed to stand probably over night, or part of the next day, are probed with a crow bar, and, if satisfactory, the sides are broken in, the top earth at one side filled in, and the hole is ready for the tree.

We have set all our trees in wet weather, which insures a storage of moisture under the tree. If one were compelled to set in dry earth a generous supply of water should be added to settle the hole prior to throwing on top earth that makes the bed for the tree to set on. Twice each spring a circle should be worked up to a fine mulch about the depth of a spading fork. This circle of mulch should be kept loose, unbaked and free of weeds the entire growing season.

Last November we had occasion to remove some filler trees, Grimes, Golden apples, seven months after setting out, one of which was spade set. They were taken up with the greatest care so we could get the roots out intact just to prove to ourselves what difference in root growth we would find in same variety, in perfectly matched trees on the same ground, from the two methods of setting.

The spade set tree had a fine bushy and vigorous tassel of roots about a foot long. The dynamite set tree had two roots going down some three feet or over. I held it out at arm's length, my hand clasped around the graft scar, and the roots touched the earth. Also, it had a great quantity of medium and short growth roots. The difference was so great and convincing that we now have thirty acres of new orchard and every tree is set with dynamite.

You will probably be amused at my zeal, but I used half sticks of dynamite in making up a rose bed, and also for a hardy border set with peonies and other perennials. Am happy to say the peony plants are now ready to bloom profusely their first season, although, hitherto, I have failed to bloom them before the second or third year in the new ground.

We wouldn't undertake to clear ground or set new trees, shade or orchard, without using dynamite, notwithstanding our soil is a beautiful loam, with little stone in it, and runs from five to six feet deep.

Yours truly,

MRS. JOHN RAWLEY.

RESULTS OF BLASTING ON ROSECLIFF FRUIT FARM

Dynamite Kills Fungus Disease. Makes Trees Grow Twice as Fast.

Having learned that Mr. James Craig, President of the Rosecliff Fruit Farm of Waynesboro, Va., has been using dynamite in the tree planting and regeneration work in his extensive orchards for several years, we sent an investigator to obtain his views. The following is a report of the interview:

Mr. Craig is a very progressive fruit grower. He is one of the first among Eastern orchardists to employ orchard heaters; as a result of this enterprise the fruit on his trees was saved in the spring of 1911, when a heavy frost killed all other fruit in the neighborhood. Mr. Craig has also used dynamite for killing fungus diseases in the ground under and around old trees which have died of fungus diseases. As a result, he has been able to use the ground for replanting, something which has been considered inadvisable previously.

Our representative obtained a number of photographs of trees on Mr. Craig's property, some of which we reproduce in this booklet.



Figure 9.
Six-Year Old Apple Tree, Planted in Spade Dug Hole, Rose Cliff
Fruit Farm, Waynesboro, Va.



Figure 10.
Six-Year Old Apple Tree, Planted with Dynamite in Same
Orchard as Tree in Fig. 9.

Figure 1 shows a five year old apple tree planted where an old apple tree had died of a fungus disease, which indicates Mr. Craig's success in overcoming this dread disease.

Figure 10 shows a six year old apple tree planted in ground prepared by exploding a half cartridge of 40% strength Red Cross Extra Dynamite at a depth of eighteen inches.

Figure 9 shows a view of another tree planted in the same month of the same year by the ordinary method of digging a hole with spade and pick. By comparing the height of this tree with the man holding an eight foot rod in his hand, also shown in each picture, the difference in the size of the trees can easily be seen.

Figure 11 shows a nine year old tree planted in ground prepared by blasting a half stick of 40% strength Red Cross Dynamite at a depth of eighteen inches. Figure 12 shows a nine-year old tree planted in spade-dug hole. The two trees just referred to, are not 200 feet apart.

The soils in both plots shown are practically identical; the trees in these orchards are both of the same species of apples; but, as will be noted from the photographs, the trees planted with dynamite show very good growth, whereas the trees which were not planted with dynamite show up poorly.

In February of 1911, Mr. Craig did some blasting in his orchard, with a view of loosening up the soil midway between his trees. He used in each hole one-half cartridge of 40% Red Cross Extra Dynamite, exploded at a depth of eighteen inches. One of the objects of this blasting was to break up some shale underlying a great many of the trees and preventing the deep growth of the roots. To see what results these blasts accomplished, some of the soil was afterwards dug out with shovels. It was discovered that the ground had been broken up at a radius of from six and one-half to eight and one-half feet from the hole in which the blast had been discharged, thus giving the tree roots an opportunity for deeper and more healthy expansion.

It is generally known that Oregon orchardists enjoy the cream of the trade in apples, pears and certain other fruits. There are numerous reasons for this; chief among these, probably, is the beautiful coloring of the fruit they produce. There is something extremely appetizing and attractive about the glorious big red apples sent to the markets by the Oregon growers. People are attracted to the fruit stands by this coloring. They are willing to pay double the price of ordinary fruit for an apple which thus tempts them. Even the coloring of fruit may be influenced by dynamite blasting. The phosphate, nitrate and potash salts, if permitted to lie in the soil insoluble, due to lack of moisture, cannot be made use of by the tree; but when the ground is loosened up to permit of the free passage of moisture through it, these salts become soluble and are then taken up by the roots of the tree, sent to the fruit,



Figure 11

Nine year old apple trees planted in ground shattered with $\frac{1}{2}$ cartridge 40% dynamite placed at depth of 18 inches. Apple trees planted 30 feet apart on square system.



Figure 12

Nine year old apple trees planted in ordinary manner with shovel, same variety and age as Figure 11 and not 200 feet away, same soil. Apple trees planted 30 feet apart on square system.

and acting in conjunction with the sun's rays, the fruit is then turned to the desired high coloring. An orchard which lacks moisture will produce fruit of a pale color.

An important discovery was recently made by Mr. J. C. Whitten, Horticulturist of the University of Missouri. He found that fungus diseases which attack the roots of apple trees could be controlled or prevented by discharging a charge of dynamite in the ground beneath a dying apple tree, or under the stump of an old apple tree, or in the ground where a stump had stood, allowing it to weather all winter. This discovery saves much valuable orchard land, as formerly it was impossible to plant an apple tree at a point where an apple tree had died, or a peach tree where a peach tree had died of a fungus disease.

Mr. W. R. MacDonald of Columbus, Kansas, reported that he planted 9 peach trees a few years ago to determine positively whether anything was to be gained by using dynamite. Three of the trees were planted in holes made by drilling a two inch auger hole three or four feet deep and detonating a charge of explosives in the bottom; and the other six were planted in holes of the regulation size dug by hand. Three years later, the trees which had been planted in the blasted holes were stronger and healthier, and produced between five and six bushels of very fine peaches, but the six trees planted in the same ground without blasting, bore practically no peaches, both fruit and leaves having shriveled up and dropped off during the dry season.

A similar experience was that of Mr. Howard Hester of Colony, Kansas, who set out an apple orchard more than twenty years ago. After digging holes for a number of the young trees, he bought a case of dynamite, some blasting caps, and safety fuse, with which to blast holes for the remaining trees. He reports that the trees planted in blasted holes are superior in every way to the others, and that they have produced better fruit and more of it ever since they began bearing.

The reason why blasting between the rows benefits the trees is that it's at ends of roots trees take up moisture and plant food. No moisture; no food. During summer little moisture reaches ground around trees within the foliage area; the foliage deflects it to edge of foliage line, hence, trees do not get the moisture they should. Naturally the earth under the foliage protected area absorbs it away from end of roots. Hence, extra valuable results accrue from subsoiling between rows.

DYNAMITED TREES THRIVE IN SPITE OF UNFAVORABLE SEASON.

St. Clairsville, O., July 10, 1911.

We have, this year, used dynamite in planting orchard trees. So far as the season has gone under the most unfavorable season in years we have had most satisfactory results. We intend to plant, this Fall, 500 to 1000 trees in the same way, which we would not do if past trial had not proven a success. Will report to you again regarding our experience.

We are,

Yours truly,

THE RILEY FRUIT FARM
Per J. W. Riley.



Figure 13
 Portion of row of grapevines that had been dynamited the previous Fall

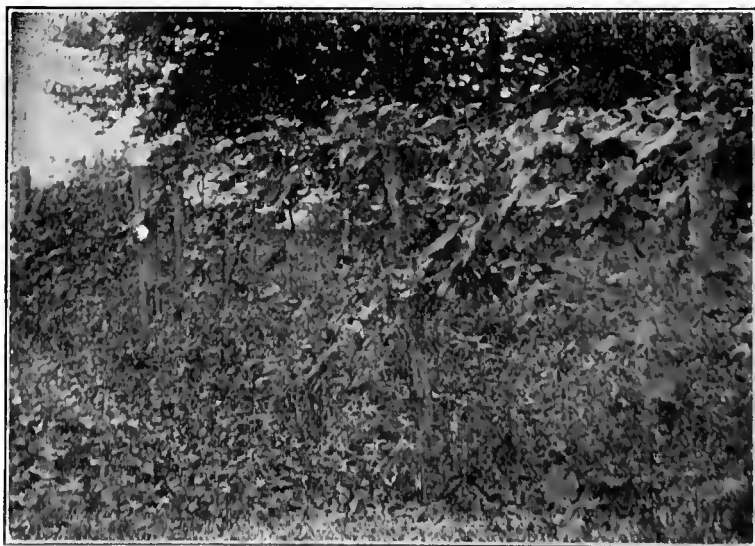


Figure 14
 Grapevines 20 feet away on same row, which were not dynamited

Arlington Heights Land Company of Riverside, California, have used explosives for several years in their orange groves. Mr. James Mills, Manager of this Company, has probably had more experience along this line than any man in Southern California. His method is to put down a hole 5 feet deep between four trees in which the charge is exploded. The shot throws out the rock or hardpan and leaves an excavation about 6 feet square and 5 feet deep. This hole is then filled with alternate one foot layers of manure and surface soil.

Mr. Mills advises that on a recent visit of a prominent horticulturist connected with the U. S. Department of Agriculture, he opened one of these holes to show results. They found a perfect net work of lateral roots and feeders, showing that four trees were obtaining nourishment from this one hole. The property is now one of the best paying investments in California, and the management attributes its success to the methods employed.

Other California orange growers blast between their trees in August, September, and October, when the ground becomes so hard and dry that it will not absorb moisture. When thoroughly broken up by the blasts, the trees, which were formerly wilted, will show new life and vigor in from seven to ten days.

Orchard Dynamited Twenty-one Years Ago.

A pioneer in tree planting with dynamite was W. R. Gunnis, of San Diego, California, who, some twenty-one years ago, planted an orchard in this manner at La Mesa, near San Francisco. It appears that Mr. Gunnis observed the necessity for breaking up hard and impervious sub-soils as preliminary to successful tree-planting, and after struggling with the cruder method of pick and shovel, finally hit upon the idea of using dynamite, thus obtaining the result in view at a reduced cost, and with a great saving of time and labor. About forty acres were planted. The charges of dynamite were exploded in the midst of the hard stratum and the trees planted in the holes thus excavated.

It was observed that the orchard matured more rapidly and resisted drouth and other unfavorable conditions with marked success. For many years this orchard was recognized as one of the most productive and best appearing in the neighborhood. Some of the trees are still thriving, although the tract has been subdivided and used as residence property.

Reviving Failing Trees

Dynamite is also an effective agent in regenerating old orchards. A charge of slow acting explosive under or between old trees, loosens up the soil and allows more root expansion, besides killing ground worms, which may be injuring the roots.

BLASTING SAVES DYING GRAPE VINES,

Wilmington, Del., June 3, 1911.

On my farm near here I have quite a number of grape vines and a year ago I noticed at the time the leaves should have all been out that the vines appeared to be dead. The buds appeared to be blighted in some way. However, late in the season the leaves finally came out but there was no grapes on the vines. Last fall I had a demonstrator on the place doing some subsoil blasting and I had him blast between the rows of grape vines about every 10 feet or 12 feet along about $\frac{2}{3}$ of the rows, the balance was left unblasted to see whether there would be any difference between the blasted and unblasted. This spring on the vines on the ground that was blasted the leaves came out early and grapes formed in abundance while the portion that was not blasted was exactly the same as a year ago. It would look as though the blasting had conserved the moisture during the winter and made the vines more vigorous and better able to overcome the blighting conditions than the portion not blasted.

W. C. MATTHEWS.

DYNAMITE SAVES OVER HALF OF NEW SETTINGS, ALTHOUGH GROUND HAD NEVER BEEN PLOWED.

E. I. du Pont de Nemours Powder Company,
Wilmington, Delaware.

Parkersburg, W. Va.,
July 8th, 1911

Gentlemen:—Our first experience with dynamite in orchard work was during the spring of 1911. Sufficient time has not yet elapsed to demonstrate positively the benefits to accrue. The season in this locality has been extremely unfavorable for starting a young orchard. The soil has been unusually dry ever since the trees were planted.

As we considered the use of dynamite in the orchard work in the nature of an experiment, we left a number of checks for comparison. We used dynamite for digging holes for planting of apples, pears, quinces, cherries and plums. In all these, the trees were planted in sod, and the ground was not broken except with dynamite. In other portions of our orchard the same kinds of trees were planted in ground that was carefully plowed and has been since cultivated several times. There is no decided difference in the trees planted by the two methods. Where the trees were planted in sod, however, without the use of dynamite, from *sixty to seventy-five per cent. are dead.* Whereas, where the dynamite was used, the loss will not exceed *two or three per cent.*, and in the cases where the loss occurs, the cause is foreign to natural conditions.

In addition to the large fruits above mentioned, we have just recently cultivated a vineyard by putting in small shots of one-third of a stick each, every eight feet in the row. We were led to do this after seeing what we believe to be decided benefits in its use for planting and cultivating apples and other fruits.

In addition to this, we used dynamite for cultivating, in a limited way, an old orchard. The trees in this orchard are from twenty to thirty years of age. Up to the present season the orchard has been badly neglected. We used one-third of a stick directly under the trunk of the tree, about three and one-half feet deep. The explosion did not disrupt the surface, but evidently broke up the subsoil and destroyed the old formation which bound the roots of the trees. This was used early in the season before the trees were in bloom. These trees at this time show a decided advantage over trees in the same orchard under like conditions, which were not so treated. The growth has been *at least twenty-five per cent. greater, they are loaded more heavily with fruit than the other trees, the fruit is larger size,* and the leaves and general appearance of the trees indicate a more vigorous thrifty condition. We consider the use of dynamite in the cultivation of an orchard, as above described, one of the most beneficial purposes to which its use is adapted.

Our experience, up to this time, indicates a more extensive use of dynamite in the future. Its use is both expeditious and economical. Its benefits are peculiarly apparent in a dry season like this. By its use the roots of the trees are permitted a greater penetration than would be possible by any other method, thus, to a certain extent making the tree independent of surface conditions.

We used, approximately, a ton of dynamite this season, without the slightest accident. The men become familiar with its use and do not consider the labor hazardous.

Yours truly,

ROSEMAR ORCHARD COMPANY. By B. P. Moats, President

PLANTS SIX HUNDRED ACRES OF CITRUS FRUITS WITH DYNAMITE FOR \$6.00 AN ACRE.

Woodlake, Cal., June 30, 1911.

During the past three years we have set out six hundred acres of lemon and orange trees and in every instance have used a stick of your dynamite (Red Cross) in the hole where the tree was planted. The trees are all healthy and doing fine. There is a very marked difference between the trees that were set in this manner and those not dynamited.

In using this dynamite we bore a hole three feet with a two inch auger at a cost of about two cents per hole, which, with the cost of the dynamite and the labor in exploding same for ninety holes per acre is about \$6.00 per acre. There is no other manner which the ground can be prepared so well for planting at this cost.

WOODLAKE ORCHARD COMPANY, By G. F. Stevenson.

DYNAMITED NEW TREES SUCCESSFULLY SURVIVED DROUTH.

New Albany, Ind., June 29, 1911.

Gentlemen:—I used dynamite in planting my orchard of more than four thousand trees I used one-third of a stick of 40% dynamite for each tree. I drilled a hole for each tree about two feet deep and tamped the dynamite tightly, exploding each charge with fuse. The explosion loosened the soil within a radius of about four feet to a depth of about thirty-six inches.

With my long experience of planting trees, I find the use of dynamite the most successful method. The loosened soil acts as a reservoir to hold moisture. I planted my orchard in the spring and find that my loss of dead trees will not exceed 5%, notwithstanding the fact that we have had a six weeks' drouth, this low percentage being due to the loosened soil holding moisture. Under no circumstances would I think of planting an orchard without the use of dynamite. I recommend it as the cheapest, quickest, most successful and most satisfactory method.

NEWTON A. GREENE, Mayor, City New Albany, Indiana

DYNAMITE SUCCESSFULLY USED FOR TWENTY YEARS IN CRANBERRY GROWING.

Mr. A. J. Rider, Secretary of the American Cranberry Growers' Association, of Hammonton, N. J., writes:

I have used dynamite in the development of my cranberry enterprises with success and economy for the past twenty years. In removing obstructions from water-courses, opening ditches and preparing the way for dams and flood-gates it is especially useful. I keep a supply on hand at all times, and my foremen are all instructed in its use. The saving in time and labor thus effected is very great.

Dynamite will make a straight ditch and under conditions with which nothing but a dredging machine could cope. In excavating for flood gates the mud walls are temporarily packed so solidly that water hardly seeps through. A crow bar and a stick of dynamite will stop a leak in a dam that would otherwise require hours, and possibly days of labor. All cranberry plants are susceptible to fungus diseases, and much experimenting has been done by growers and government experts to control this enemy. Without being able to give scientific reasons I owe it to dynamite that there has never been fungus growth at Hampton, one of my largest plantations, where I have used it freely.

If the advantages to be obtained through the use of dynamite were brought to the attention of all large cranberry growers I believe you would be doing them a great service.

Very truly yours,

A. J. RIDER.

FAMOUS ORCHARDIST USES DYNAMITE IN PLANTING AND RENOVATING ORCHARDS.

E. I. du Pont de Nemours Powder Co., Wilmington, Del.

February 22, 1911.

Gentlemen:—I am just back from a two weeks stay in our Georgia Orchards.

While I was there we continued further blasting for the replanting of about 3000 trees where they had failed in one of our older orchards. I also looked over carefully the two little blocks of trees we planted with dynamite last season and the results are even better than I had been led to believe when I left there the middle of July. In the meantime I am becoming further interested in the matter and in the recommendations for renovating some of the old apple orchards in New England and want my clients to try dynamiting a portion of the land around these trees, especially when they are in particularly strong heavy soil.

Yours,

J. H. HALE.

NOTE.—Mr. Hale is the owner of several of the largest commercial orchards in the United States.

DYNAMITE SUCCESSFULLY USED IN PLANTING PECAN TREES.

Mr. S. H. Bolinger, President Clear Creek Lumber Company, Shreveport, La., writes us under date of April 26th, 1911, that he used dynamite in blasting the holes in which 1,080 pecan trees were planted a year ago; also for planting 8,000 peach trees. He says the percentage of loss on the pecan trees (which are among the most difficult to set so that they will live) was almost nothing compared to the loss on other trees planted in the ordinary way.

Mr. Bolinger explains how the planting was done. The soil was a hard sand clay. A 2-inch auger with a long shank was used and a 2-inch hole bored about 4 to 4½ feet deep. In the auger hole one stick of 40% dynamite with fuse attached was inserted, the hole filled and lightly tamped; then exploded. The explosion created a space of about the size of an ordinary barrel. The ground was not blown out but was simply raised on the top about 3 or 4 inches. In almost every case, however, it could be seen that the ground had been thoroughly loosened up for a distance of 10 to 15 feet all around the hole. A post hole digger was then used to bore through the top surface to the vacant space below; the surface soil necessary to bore through was about 10 to 15 inches thick. The top soil was then filled in to the depth necessary and the trees planted in the holes, the ground being well packed around the roots.

It is Mr. Bolinger's opinion that the planting was successful because the opening up of the soil under the trees by exploding the charge of dynamite created a space for the storage of moisture which was held throughout the dry spell that followed the planting and thus kept the trees alive and in healthy condition.

GAINED TWO YEARS BY PLANTING WITH DYNAMITE

Gentlemen:—It may be a surprise to you to learn that I have been using dynamite for planting trees for a number of years and have some shade trees planted in that way eighteen or twenty years ago. They are the finest trees I have ever seen grow for their age. In the planting of peach trees I gained two years in six; in other words, I got as much fruit from a tree planted with dynamite at four years old as we usually get at six years old.

I not only plant them with it but where a tree is failing and seems to be on the decline, I start it off to growing again by firing charges from three to ten feet apart.

Nothing seems to tickle the earth so much as planting watermelons after explosion of dynamite from three to four feet under ground. I plant them twenty feet apart each way. Fertilize heavily and the vines bear right on until frost, the entire summer.

Yours very truly, W. W. STEVENS, Orchardist, Mayfield, Ga.

TWO MEN AND DYNAMITE ONE DAY BETTER THAN THREE MEN ONE WEEK WITHOUT DYNAMITE

A. F. BORNOT BRO. CO., 17th Street and Fairmount Avenue

Philadelphia, Pa., April 26, 1911.

Dear Sirs:—Your Mr. Fulmer was here Monday and together we made about one hundred holes which has enabled my gardener to plant one hundred peach trees the following day. Three men could not have done the same amount of work in a week. The ground is now very loose; I am more than pleased and would not plant another tree on my place without explosives.

Very respectfully, A. F. BORNOT BRO. CO. L.

USED IN LARGEST PEACH ORCHARD IN U. S.

Superintendent J. H. Baird, of the famous Hill Georgia Orchard, of Fort Valley, Georgia writes under date of May 20th, 1911:

"The trees planted this season with dynamite are growing beautifully and we have not lost any through drouth, while those planted without dynamite have died out badly and show poor growth."

On June 17, 1911, Mr. Baird again writes:

"Vegetation is burning up here for lack of rain, but the young trees have lived beautifully; do not think we have lost over 2% of those planted with dynamite, while of the others planted in the old fashioned way we have lost from 50% up."

Setting Trees With Dynamite to Conserve Moisture

ARTHUR E. COLE, Prop., High Point Farm and Nursery, Chamblee, Ga.

Over a large portion of our country is a hard pan, shale or tight clay lays near the surface. It is a menace to the productiveness of trees and all vegetables which root deeply. The scientific principle involved is the inability of such a sub-soil to absorb, retain and give back to growing crops the essential moisture. On such land, the water soaking through a thin top soil fails to penetrate and finds a second drainage on this sub-surface, draining off in "Wet Weather Springs" or standing in surface suspense as "Bogs." Land in this physical condition fails of an agricultural dividend. Put in proper physical condition this same land becomes highly profitable. The way to proceed is by using dynamite. Probably no process of plowing known to agriculture can produce the good results in breaking up a tight sub-soil as does this blasting with Du Pont Dynamite.

Planters of clover and alfalfa know this by experiment. Orchardists have come to accept it as final. Strawberries and all crops requiring a great amount of moisture respond to its use in a way almost unbelievable. Short lived crops like tomatoes and cucumbers will continue to bear through the long season where the hills are shot with cartridges of dynamite. Figs produce a crop the first year after being set where dynamited. The writer can see this from his back door as he writes. This new-found process is the foundation of a new era in agriculture and horticulture. It is the horticultural application that this article aims to emphasize.

At the present time many thousands of trees are being set in young orchards all over the United States. Such a boom in apple and pecan planting was never before known. It is a logical answer to an unsupplied demand. The question is, will these orchards endure,—will they pay? The answer rests largely with the mode of setting.

In orchard setting, the use of dynamite is advised in practically all soils. The pecan naturally flourishes on the deep, moist, alluvial soil of river and creek bottoms. Nature has put it where it will not suffer from drought in the long, hot, dry summer and autumn through which it must hold and mature its late fruit. We can move it to our grove or back yard and succeed with it by conserving the moisture by dynamiting the ground.

The method of dynamiting follows under discussion of apples.

Watermelons and peaches should be dynamited because they require great moisture, being fruits composed largely of water, but of all fruits demanding an unfailing and continuous supply of moisture the apple and pecan lead. Therefore, it is imperative that we dynamite as an artificial means of conserving the moisture. Unlike all other fruit, the apple grows on the end of a twig of new wood, a twig which bears no more. The apple being a bi-annual, sets its fruit bud for next year during July and August of this year. So we see this hard condition imposed: a winter apple must make its new growth of wood, hold its foliage, mature its present crop of fruit, and, if it is to produce again next year, the little tender twig bearing an apple must mature a new fruit spur or twig along side of it to bring forth a healthy fruit bud next year. And all this during a long, hot summer or autumn. The demand for moisture is enormous.

What if the tree is shallow set? What if the roots trail along close to the dry surface? What if the tree is on a dry ridge or hill-side baked by the summer sun? What if on thin land, starved for both fertility and moisture? The answer may be total failure or partial failure and short lived trees, or a partial crop, or a crop only every other year, or a large per cent. of drops, or defoliated trees. **READER!** Observe and mark well. Your orchard dividend and its future success is in balance when you *set* your orchard. Remember you can never set it over the second time. No amount of regrets can retrieve a mistake made in the setting. You will spend much money bringing your orchard to a high standard by the allotted time for it to begin to bear, but no amount of money expended in after years can correct a mistake at planting time. You may have in mind plowing out a deep furrow for your row, but remember that that furrow can never be plowed again, and the root system will be influenced to confine its growth to the small amount of pulverized soil. Holes may be dug, broad and deep, but like a large plant in a small pot, the hard walls of the hole when filled with roots will cramp or turn back or callous. In either of these methods, the orchard dividend will be found wanting.

The new and eminently successful mode of land preparation for all fruit or ornamental trees and for many field or garden crops, especially in tight, dry soils, is by blasting holes with $\frac{1}{2}$ cartridge of Red Cross 40% Extra Dynamite or blasting the furrow with a like amount at intervals of 15 to 20 feet. If in a large orchard or a large field, a battery may be used to discharge caps. If only a few trees are to be set, the blasting should be done with fuse and blasting caps. Let the depth of the holes for setting your cartridges be governed by the state of the soil. Make a hole with auger, sharpened wood dibber, or crowbar well down into the subsoil. Tamp well with moist clay. For the best results, throw out a bushel or more of the clay that has been broken by the shot and fill with some organic matter that will slowly decompose as the years go by mixing and cutting in well with a sharp shovel or spade. Leaf mold, woods top soil, fence corner settlings, old bones, scrapings from under an old house or out house or any such matter is good. Now the tap root can go down and out in an area broken and pulverized for many feet on all sides. The tree will make a rapid and healthy growth and come to bearing earlier and live many years longer. It will produce fruit annually, more fruit, larger fruit and fruit of better color because of the conserved moisture. It will resist drought. The much talked of "insect resisting tree," is not a tree immune from insects, but a tree healthy and vigorous enough to overcome their baneful attack.

The writer set an apple orchard last winter using Red Cross 40% Dynamite, in an area where wooly aphid is known to abound; but not a single evidence of their presence has been noted. This is a reverse of every instance of a young orchard in that section, set in the old way.

The winter, spring and summer just past is one of the driest on record for Georgia. Many trees, in fact a large per cent. of trees, set by the ordinary method have died. But in three orchards set by the writer with dynamite, 100% are living and doing well. As a neighboring nursery man expressed it, "These trees didn't know it had not rained."

It is to be hoped that in tree setting, we have learned "That a stick in time saves nine."

Why We Recommend Red Cross Dynamite For Farm-work

Red Cross Dynamite is better suited for the different kinds of blasting necessary about the farm, than any other explosive. Our many years of experience in the manufacture and use of explosives, has taught us that if an explosive is to do its work at the lowest possible cost and produce the best results, it must be made with qualities especially suited to the work in which it is to be used. Red Cross Dynamite is particularly strong in those qualities necessary in agricultural blasting.

Red Cross Dynamite is safer to handle and use in farm work than other dynamite. A large majority of the accidents which happen when dynamite is used, occur in thawing it. Most dynamite freezes at a temperature ranging between 40° and 45° F., but Red Cross Dynamite can be depended on to keep soft and in good condition in any temperature that will not freeze water. When Red Cross Dynamite is frozen, it can be thawed simply by burying the case containing the dynamite in a manure pile until the cartridge becomes soft.

When dynamite is frozen or even chilled, it cannot be properly exploded, and consequently does poor work. Most dynamite except Red Cross Dynamite, will chill and lose value in a very few minutes in cold weather. Even when loaded in cold earth or rock it will chill in a very few minutes. This loss does not happen with Red Cross Dynamite because it will remain in perfect working condition for some little time, even in freezing weather, and it does not lose any power at all after it has been loaded in bore holes below the frost line.

Red Cross Dynamite is also less expensive than other dynamites.

Red Cross Dynamite is made in the following grades and strengths: Red Cross Dynamite, 20 to 60 per cent.; and Red Cross Extra Dynamite, 25 to 60 per cent. Because it is safest to handle and costs least, we especially recommend Red Cross Extra Dynamite particularly for all blasting about the farm, unless the work is very wet, in which case Red Cross should be used. The only work about the farm for which Red Cross Dynamite is not suitable, is ditch blasting in wet ground with blasting caps and fuze in the middle hole only. In this work 50 or 60 per cent. Atlas or Hercules Dynamite should be used and the blasting should be done in warm weather.



RED CROSS EXTRA DYNAMITE CARTRIDGE, 1¼ X 8 INCHES.

Safe Handling of Dynamite.

There is a popular misconception of dynamite in the public mind. Newspapers in reporting outrages such as bomb throwing by anarchists, safe cracking "jobs" by burglars, etc., incorrectly report them as perpetrated with "Dynamite." The result is an erroneous, widespread impression that a dynamite cartridge will explode if dropped on the ground or thrown against the body of a person.

As a matter of fact, safe breakers and bomb throwers do not use dynamite cartridges at all; they would not be suitable for their purpose because it is so difficult to explode them. What these criminals use as a rule is nitro-glycerin. This dangerous explosive is used commercially for shooting oil wells, etc.

True there is a certain proportion of nitro-glycerin in dynamite cartridges, but the dangerous explosive is scientifically compounded with wood meal, and some other ingredients in such a way that it can be absolutely depended upon not to explode accidentally if our simple and plain instructions for its use are complied with.

One of the safest of explosives manufactured by the Du Pont Powder Company is Red Cross Dynamite, which is especially recommended for agricultural purposes. This brand of dynamite, in practice, is exploded by powerful shock such as is produced by a strong blasting cap or an electric fuze.

Responsible people can use and handle dynamite just as safely as they can handle gasoline, matches, or coal oil. The energy of dynamite can be directed in the work to which it is adapted just as well as the energy of steam can be directed in the work for which it is used.

Instruction Book Sent FREE

IF the foregoing pages have convinced you that possibly explosives can be used to advantage on your farm, the next questions that will arise in your mind are: How are they used? What do they cost? What quantities are needed? What other supplies or apparatus are needed, etc? All these things are fully and clearly explained in our large booklet, "The Farmer's Handbook of Explosives," which may be obtained, free of charge, by cutting out and mailing card No. 1 printed on the inside back cover of this pamphlet.

We believe that when you have read the book, you will understand how simple, safe and economical the use of Red Cross Dynamite is, and that you will find many ways to save and make money with its aid.

E. I. DU PONT DE NEMOURS POWDER CO.
WILMINGTON, DELAWARE

Post Card No. 1

IF YOU ARE A FARMER AND WANT TO KNOW MORE ABOUT THE USES
OF DYNAMITE, COST, ETC.,—CUT OUT, FILL IN AND MAIL THIS CARD

E. I. du Pont de Nemours Powder Co., Wilmington, Del.

Gentlemen:—Please send me, free, your Farmer's Handbook and full information about the use
of Red Cross Dynamite for the work before which I have marked X.

<input type="checkbox"/>	STUMP BLASTING	<input type="checkbox"/>	BREAKING UP HARDPAN
<input type="checkbox"/>	BOULDER BLASTING	<input type="checkbox"/>	SUB-SOIL PLOWING
<input type="checkbox"/>	TREE PLANTING AND CULTIVATING	<input type="checkbox"/>	ROAD MAKING
<input type="checkbox"/>	DITCHING AND EXCAVATING	<input type="checkbox"/>	DRAINING SWAMPS

Name.....

St. & No. or R. F. D.

P. O. State.....

Where is your farm located? How large is it?

What City is Nearest You?

Post Card No. 2

IF YOU WANT TO TAKE UP PROFESSIONAL BLASTING—CUT OUT,
FILL IN AND MAIL THIS CARD

E. I. du Pont de Nemours Powder Co.,
Wilmington, Del.

Gentlemen:—Please send me, free, your Farmer's Handbook containing full information about
the use of Red Cross Dynamite in Farm-work; also explain how I may become a professional blaster
and how you will help me secure work at blasting from farmers in my neighborhood.

Name.....

St. & No. or R. F. D.

Town..... State.....

Post Card No. 3

IF YOU WANT TO BECOME A DEALER—CUT OUT, FILL IN
AND MAIL THIS CARD

E. I. du Pont de Nemours Powder Co.,
Wilmington, Del.

Gentlemen:—Please send me, free, your Farmer's Handbook containing full information about
the use of Red Cross Dynamite in Farm-work, and your proposition to storekeepers involving the
taking of orders only, carrying no stock of dynamite.

Name.....

St. & No. or R. F. D.

Town..... State.....

What is your present business?

Who is your Jobber?

